



the mines and minerals of

Rico



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Once heralded as *"the New Leadville,"* Rico never lived up to that lofty expectation. However, it did become a major producer of silver, zinc and lead, leaving behind a colorful history and numerous fine mineral specimens.

INTRODUCTION

Located in the southwestern corner of Colorado, the town of Rico (elevation 2700 meters/8800 feet), is situated near the center of the Rico Mountains, which are an isolated branch of the San Juan massif. Once the county seat of Dolores County, Rico now is home to a summer population of only about 200. Rico is approximately 40 km (25 miles) south of Telluride, and is served by state highway 145. Rico is in the Pioneer mining district (commonly referred to as the Rico mining district), and is found on the *Rico, Colorado* 15-minute quadrangle.

The picturesque area surrounding Rico is characterized by rugged 3,700-meter (12,000-foot) peaks, cut by deep canyons and gulches. The lower slopes are typically smooth and rounded due to alluvium left by ages of landslides. This condition limits rock outcrops, and severely impeded the pioneers first efforts to prospect the area. Rico itself rests in a narrow valley on the east bank of the Dolores River at its confluence with Silver Creek. The winters are long and often harsh, with much snowfall; while the summer season is short, it is characterized by mild days and cool evenings. The mountain slopes surrounding Rico are forested with aspen, blue spruce, Englemann spruce and fir. In the spring and early summer the meadows are ablaze with wildflowers.

HISTORY

The earliest recorded history of the Rico area begins with the Spanish explorers. There is some evidence that the Spanish made limited attempts at mining in the Dolores River Valley. However the large scale mining and prospecting efforts of the late nineteenth century argonauts either destroyed or largely covered over most of the work done by the Spanish. The real evidence of Spanish influence in this part of Colorado may be noted in the local place

names, such as the San Juan Mountains, Dolores River, Cortez, Durango and Rico.

In 1833 a group of trappers from St. Louis under the command of William G. Walton spent the summer trapping along the Dolores River, near Trout Lake (19 km north of Rico). This group, believed to be the first Anglos in the area, reported the presence of numerous Indians and the remains of crude Spanish furnaces (smelters). In 1861, a group of men led by a Lieutenant Howard prospected the Dolores River Valley. This contingent was part of the Jim Baker Party (Baker Park fame) which was prospecting an area to the east that later would come to be known as Silverton. In 1864 Robert Darling led a small band of army officers and Mexicans to mineral outcrops along the banks of the Dolores River. Sheldon Shafer and Joe Fearheiler staked the first claim in the area in 1869. Their claim was called the Pioneer, from which the district drew its name. The Pioneer claim was later developed as the Shamrock and Potter mines.

It is noteworthy to mention that prospecting in the San Juan Mountains was a dangerous undertaking in the 1860s. The elements took a terrible toll and the Ute Indians also made their presence felt in a rather ominous way. Joe Fearheiler became one of the many victims of the Utes, killed shortly after staking the Pioneer claim. Also in the year 1869, seven men including a Captain Bennett, Lieutenant Ford, J. French and Robert Darling staked the Atlantic Cable claim on the east bank of the Dolores River. In 1870 Gus Begole, who had first explored the region in 1860, returned with John Echols, Dempsey Reese and Pony Whitmore. They located the Nigger Baby and Dolores claims (later called the Yellow Jacket and Aztec). Because the ore grade was low and transportation costs high, the claims were abandoned.

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Figure 1. Southern approach to Rico, snow-capped peak of Telescope Mountain on the right. Photo by the author.

In the summer of 1870, Robert Darling located some claims near Shafer and Fearheiler's, and built a cabin (the first permanent structure in Rico) beside Silver Creek. Darling Ridge, a spur of Expectation Mountain, was later named in his honor. Darling and others continued to intermittantly work the Atlantic Cable, Aztec, Yellow Jacket and Phoenix claims. By 1872 they had constructed a smelting furnace and produced three bars of gold bullion. The claims were all abandoned in the winter of 1872-73. In October of 1873, by way of the Brunot Treaty, the Ute Indians ceded to the United States the mineral-rich land in the Dolores River Valley. Just when it was becoming safe to prospect, the panic of 1873 curtailed development for several years.

The Hayden Mineral Survey, which came through in 1874, provided the first accurate maps of the area and also gave names to many of the local topographical features. Colorado gained statehood in 1876 and, with the 1873 economic problems behind them, a steady stream of prospectors again found their way into this isolated part of the San Juan Mountains. In 1878, John Glasgow, Charles Hummeston and Sandy Campbell began to develop carbonate ore in the Phoenix, Yellow Jacket and Atlantic Cable prospects. The group cleared out with the coming of the winter snows; however, throughout the winter and spring (1878-79) word of the carbonate ores spread like wildfire. There was much cause for optimism; after all, greater mineral rushes had been started on much less fact. Soon people were talking about a "new Leadville," and the little tent village by the Dolores River began to grow.

The year 1879 brought three important silver discoveries. The first occurred when Simon Ransom and J. C. Haggerty discovered oxidized silver ore on Nigger Baby Hill. Nearly all of the major discoveries of the 1880s were centered around Nigger Baby Hill. Charles H. Carpenter discovered ore on the lower slopes of

Telescope Mountain (just north of Nigger Baby Hill). Later this area would be called C.H.C. Hill, in Carpenter's honor. The third major discovery was made on Newman Hill, just southeast of Rico. Harry Irving located the silver-rich Chestnut vein; however, nearly ten years would pass before the importance of this discovery was to be felt.

The new discoveries on Nigger Baby and C.H.C. Hills served to further heighten the rush to the area from neighboring camps. On October 11, 1879, the camp was incorporated. Having been previously called Carbonate City, Dolores City, Doloresville and Lead City, the name Rico (meaning rich in Spanish) was decided upon. The new town had a population of 12,000. The new finds necessitated the need for a smelter. In the fall of 1880 the Grand View smelter was blown in, under the supervision of Messrs. Endlich and Arnold. T. A. Rickard (1896) remarked, "That smelter afforded many well known metallurgists their early and hard bought experience. Its history would present an amusing commentary on the struggles of ill-digested enterprises." In 1881 the Rico Mining and Smelting Company built Rico's second smelter. In the same year up on Newman Hill, David Swickheimer, Patrick Cain and John Gualt began work on a claim they called the Enterprise, and A. A. Waggener sank a shaft on the adjoining Songbird claim. The goal of both of these operations was the previously mentioned Chestnut vein. However, owing to disappointing results, both claims were abandoned. Swickheimer traded the Enterprise to George Barlow in 1883 for an unknown quantity of lumber. Hindsight proved this to be a very unwise transaction.

On February 10, 1881, Dolores County was formed from Ouray County, with Rico being established as the county seat. In the years following 1881, Rico's future looked bright as a blossoming silver queen. However, the high cost of shipping, and the lack of good



Figure 2. Rico City Hall, built in 1892. Photo by the author.

transportation continued to plague the isolated camp. In 1883 silver was discovered along Silver Creek, which opened up a new area to prospectors.

In 1884, Larned and Hackett, while working the Swansea mine on Newman Hill, found that the vein earlier sought by the owners of the Songbird and Enterprise claims was not absent, but merely displaced. In 1886 Barlow and Waggener relocated the Enterprise and Songbird claims. In December of the same year, David Swickheimer, who had been working at the Swansea mine, bought out Waggener, thereby gaining control of the Songbird. In 1887, Swickheimer purchased the Enterprise from George Barlow, regaining ownership of the property he had traded away four years earlier. Swickheimer immediately began resinking the Enterprise shaft and on October 6, 1887, the fabulously rich Enterprise blanket orebody was intersected. This discovery was followed shortly by a similar one at the nearby Rico Aspen mine. The discovery of the blanket ore deposits on Newman Hill not only saved Rico from an early demise, but fed new spirit into the camp, and inspired renewed interest throughout the district. In 1890 the Enterprise and Songbird properties were merged under the name, Enterprise Mining Company.

Rico came to another milestone in 1890 when famed Colorado railroad man Otto Mears brought his Rio Grande Southern Railroad into town. Finally cheap, dependable transportation was available, and Rico truly began to prosper. By 1892, 59 mines employing nearly 2,000 miners were operating. In less than a year the number would double to 4,000. Rico had finally made the transformation from a roaring frontier camp, populated by rowdy prospectors, to a very civilized community catering to women and family life. This metamorphosis was manifest all around. The first permanent church building, the Congregational, was erected in 1892 (the same building still stands today). By 1895, Rico had passed an anti-gambling law, plus an obscure catch-all ordinance dealing with "offences against public morality." The Old West refused to die totally however, as several brothels managed to survive, with or without the blessings of the community. In an effort to save face, town officials (no doubt men), stated that keepers of houses of ill repute would be responsible for any rowdy conduct. If this rule was not obeyed, then the ordinance prohibiting such

houses would be enforced (Smith, 1982).

Nearly 3 million ounces of silver were produced in 1893, an all-time high. However, 1893 brought trouble to most of the silver mines of the American West, and Rico was no exception. The repeal of the Sherman Silver Purchase Act nearly crushed Rico's future. The price of silver fell from \$1.29 an ounce to 50¢ an ounce. This drastic drop in price, coupled with rapidly dwindling high-grade deposits (Newman Hill blanket deposits) dealt Rico a staggering blow. One by one the mines which had prospered only a year earlier began to close and a mass exodus took place. By 1900, the population had fallen to 811.

World War I and the demand for copper, lead and zinc brought some life back to Rico, with the reopening of the Wellington and Mountain Springs mines up on C.H.C. Hill. Some renewed activity took place along Silver Creek, and 1915 proved to be the peak year for production of the base metals during the war years. However the end of the war brought the closure of more mines and in 1923 the population stood at 212. In the mid-1920s, with new advances in zinc processing, a mild economic surge was felt as the Atlantic Cable, Union Carbonate, Argentine, Shamrock & Potter, Silver Swan, Pro Patria, Revenue, Yellow Jacket and Falcon mines reopened. The Falcon mine alone boasted a work force of 500 men. Good times had at last come back to Rico. Between 1925 and 1929 the activity around Rico was much like that experienced in the 1890s: The International Smelting Company built a mill to process zinc in 1926. Base metal production peaked in 1927. But the stock market crash of 1929 brought all mining activity to a halt.

In 1930, in the depth of the Depression, the St. Louis Smelting and Refining Company drove the St. Louis tunnel from the east bank of the Dolores River into C.H.C. Hill. The goal of this work was to explore the Devonian-Mississippian limestones deep beneath C.H.C. Hill for lead-zinc replacement beds long thought to exist. Failing to find any ore, the St. Louis tunnel project was abandoned in 1932.

In 1938 the Rico Argentine Company began production from its holdings on Silver Creek (most notably the Argentine mine), and in 1939 completed work on a new flotation mill. This initiated a period of continual mining in Rico which lasted more than 30 years. Gradually the small, independent operations were replaced by large



Figure 3. Dumps and old workings of the Jones mine, Dolores River in the foreground. Photo by the author.

Several companies, with the Rico Argentine Company becoming the major producer in the district. The Rico Argentine Company continued to grow, purchasing numerous inactive properties surrounding their own and bringing them into production. The Van Winkle shaft was sunk in 1942 to exploit some of the newly acquired property, and soon became the Rico Argentine Company's biggest World War II producer of lead-zinc. The 1940s also saw the Mountain Springs and Wellington mines come back into production.

The end of World War II brought a slack demand for base metals and hastened the closure of several properties. Notable among these were the Van Winkle (1948) and the Mountain Springs (mid-1950s). In spite of the depressed conditions the Rico Argentine Company continued to purchase properties, proving that through consolidation mining could still be an economic venture. In 1955 the old St. Louis tunnel was driven to the Argentine shaft, opening up new ground for development and exploration.

In spite of the stable conditions which were brought about by the Rico Argentine Company, Rico was removed as county seat of Dolores County in 1946. A greater blow was received in 1951 when the railroad ceased to service Rico, after which all concentrates had to be trucked to another railhead for shipping to the smelter.

The mines of the Rico Argentine Company continued to produce lead and zinc throughout the 1950s and 1960s, with final closure coming in 1971. Anaconda Minerals Company (Rico Project) now holds controlling interest in nearly all property of past importance. There is currently no mining activity in the Pioneer mining district.



Figure 4. The Atlantic Cable mine today. Photo by the author.

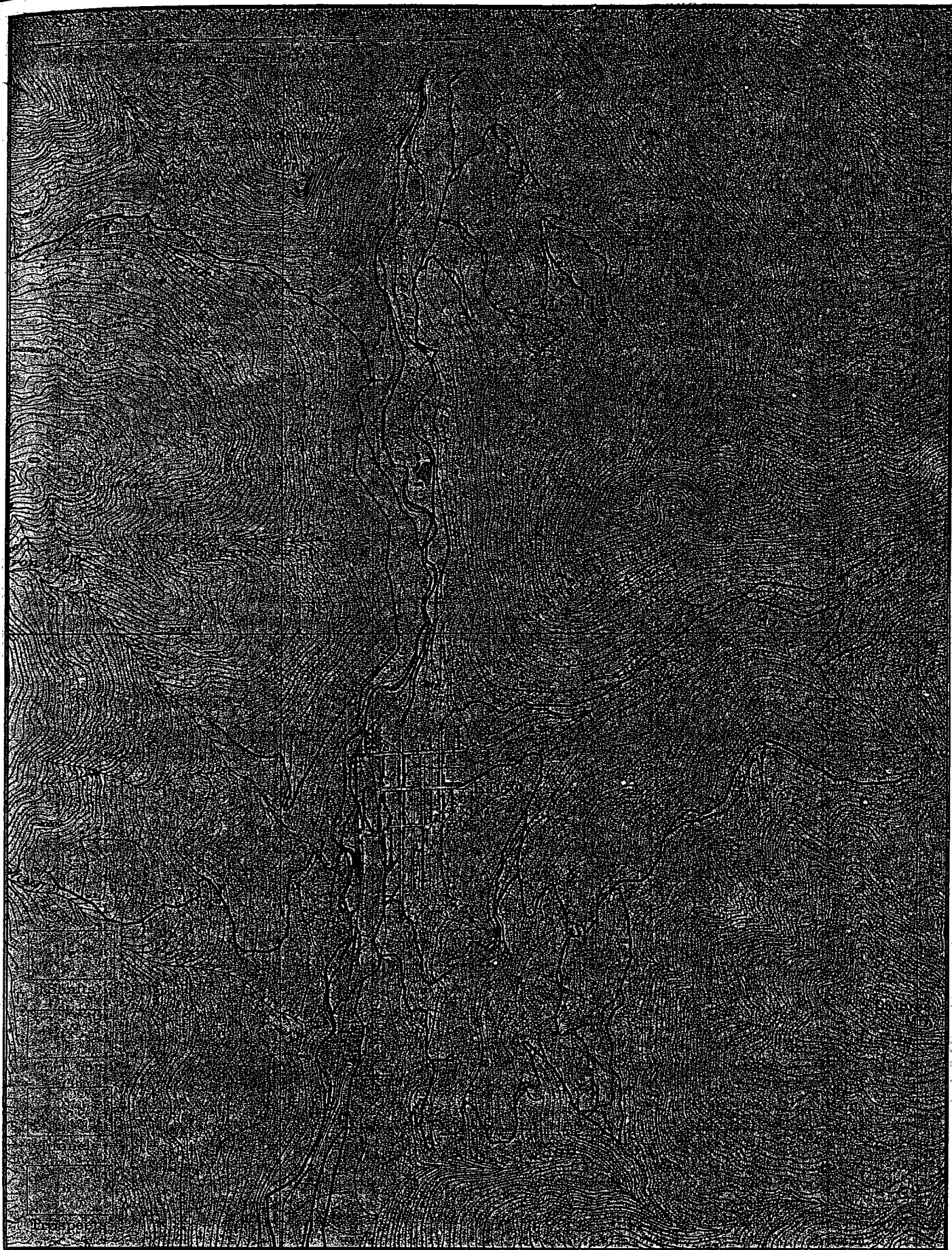


Figure 5. Map of the Rico area (after Cross and Ransome, 1905). Courtesy University of Arizona Library Map Collection.

would be instability, with Rico being a virtual barometer of economic conditions throughout the country. It has fallen prey to every economic setback which the country has suffered over the past hundred years. In spite of this, Rico has exhibited an amazing resilience. Gold spurred the first interest in the district, to be followed by the rich silver mines of Newman Hill. When the silver crash brought things to a halt, lead-zinc-copper came to the rescue, with lead and zinc continuing to be the backbone of the district until its final days. Even pyrite played a part in the history of Rico. The 1970s ushered in a new gloom for Rico; depleted ore reserves and poor base metal prices have apparently brought mining to an end in the district. Many of Rico's more substantial buildings were constructed in the 1880s and 90s. Those old buildings give the impression of having witnessed a lost era. Walking through the streets of Rico today brings to mind the words of T. A. Rickard: "Mines are short lived; they yield a harvest that is gathered only once."

GEOLOGY

The area in and around Rico was first mapped by Whitman Cross and numerous associates between the years 1897-1908, and later by Edwin McKnight and associates in 1930-31, 1955-58 and 1967. Other than the two reports resulting from these studies, very little comprehensive work has been produced on the geology of the Rico quadrangle. The scope and excellence of these reports has left little room for improvement. For those interested in an in-depth look at the geology of the region, *The geology of the Rico Mountains, Colorado* by Cross and Spencer (1900), and *The geology and ore deposits of the Rico District, Colorado* by McKnight (1974) are highly recommended.

A brief synopsis of the geologic history of the Rico area should suffice for the purposes of this article. Rico is located near the center of a local tectonic structure known as the Rico dome. The Rico Mountains, owing existence to this laccolithic dome, are composed of a thick sequence of Paleozoic and Mesozoic sedimentary rocks sharply tilted from their gentle southwesterly regional dip. A monzonite stock (late Cretaceous-early Tertiary) and Precambrian quartzites and schists, bounded by faults, occupy the central part of the uplift. The effects of dikes and sills (quartz monzonite of Tertiary age), accompanied by extensive faulting yielding displacements exceeding 300 meters contributed greatly to the eventual elevation of the Rico Mountains. The dome has since been bisected and deeply eroded by the Dolores River, exposing approximately 3400 meters (11,000 feet) of Precambrian to Cretaceous strata. Recent geologic history has been that of continued erosion and extensive landsliding. The Rico Mountains tower 1200 meters (4000 feet) above the surrounding plateau.

In the interest of brevity, only a short account of the ore deposits and mineralization of the Rico area will be presented here, in the hope that the reader will gain at least a general understanding of them. Four major types of deposits, all considered Tertiary in age, were mined at Rico: (1) fissure veins, (2) blanket deposits, (3) massive sulfide replacements, and (4) contact metamorphic deposits. Areas of mineralization are centered around Newman Hill, C.H.C. Hill, Nigger Baby Hill, Silver Creek, Horse Gulch and Expectation Mountain. The earliest deposits worked were fissure veins. In the late 1870s and on into the 1880s, much oxidized silver ore (cerussite-anglesite) was mined from the veins on Nigger Baby, C.H.C. and Newman Hills, as well as Expectation Mountain. It was the mining of fissure veins that led to the discovery of the fabulously rich silver blanket deposits of Newman Hill. Originally thought to be veins that ran parallel to the bedding planes, the blanket deposits were actually found to be replacements of thin gypsum beds in the lower Hermosa formation.

From the blanket deposits came the wealth of silver to which Rico owed its early fame. Native silver, acanthite, proustite,

among the minerals recovered from the mines of Newman Hill. Fortunately, by 1900 these rich deposits were all but exhausted. Extensive exploration brought about the discovery of massive sulfide replacement deposits in the Hermosa formation. The replacements were rich in sphalerite, pyrite and galena, with locally abundant chalcopyrite and silver-bearing tetrahedrite. Traces of gold were quite common also. Mines exploiting the replacement deposits were centered in the Silver Creek area. Of minor importance were the contact metamorphic deposits, the most notable of which was worked through the Atlantic Cable mine, just north of downtown Rico. Sphalerite, galena and specular hematite were the most common minerals found in the contact metamorphic deposits.

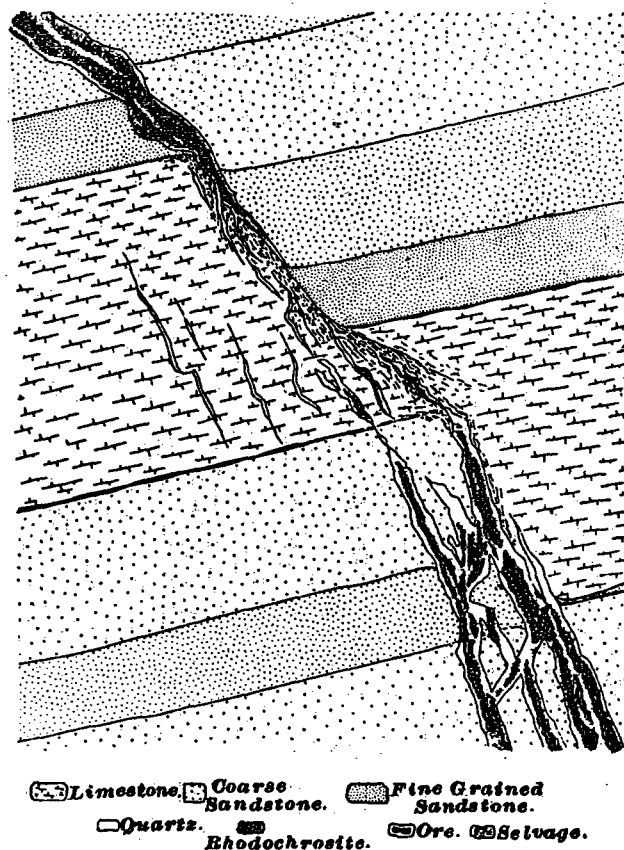


Figure 6. Mineralized vein in a fault zone, Newman Hill (Lakes, 1905).

THE MINES

The mines of Rico are far too numerous to be treated individually. Save for a few weather-worn dumps, many of the mines have left no evidence that they ever existed. This fact, complicated by little written history, makes detailed descriptions impossible. Nevertheless, the author has attempted to present as near a complete listing of Rico's mines as possible.

Mining in Rico can be divided into several centers of activity. The following is a brief description of the mines which made Rico a major mining center, arranged according to major groups or areas.

Nigger Baby Hill

Named from the numerous outcrops of manganese, the term has been dropped from modern maps and literature. However, it has been retained here in the interest of historical accuracy. Ore was first discovered on Nigger Baby Hill in 1878. This led to much activity around the Rico area. Bounded on the north by C.H.C. Hill and on the south by Silver Creek, Nigger Baby Hill was literally

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money combined with adits, inclines, shafts and drifts. This myriad of workings led to much confusion, with a continual pattern of abandonment, relocation, and unending legal battles.

The Grand View group

This is a group of mines originally consisting of the Grand View, Major, Phoenix, Pelican and Yellow Jacket (formerly filed as the Nigger Baby claim, 1870) claims. The story of these mines is essentially the story of Nigger Baby Hill. Sandy Campbell and John Glasgow staked the claims in late 1878 or early 1879 . . . the record is a little unclear on the exact year. One thing is clear however, that the discovery of carbonate ore on the property sent shock waves through the mining communities of the San Juan Mountains. In 1879, Senator Jones of Nevada and John Mackey of Comstock fame purchased the Grand View from Campbell for \$60,000 and the Phoenix and Yellow Jacket from Glasgow for an undisclosed sum. This represented the first major sale of mining property in the district. By 1880 all five claims had been acquired by the Grand View Mining and Smelting Company, with patents filed in 1881. The Grand View mine was developed by a shaft and several adits. The ore consisted mainly of cerussite which averaged over 50 ounces of silver per ton. The Phoenix and Yellow Jacket mines were operated as one, and worked the same vein as the Grand View. The ore consisted of cerussite, argentiferous galena and chalcopryite. The mines were developed by two shafts and extensive drifting. The Pelican and Major never amounted to more than prospects. By 1900 most of the upper workings of the Grand View group had caved and were inaccessible. In 1923, Robert Pellet of the Pell-Eyre Company reopened the Yellow Jacket and Falcon mines. Five years of prosperity followed before the crash of the stock market in 1929. During the war years of the 1940s the Rico Argentine Mining Company gained control of and operated the properties of the Pell-Eyre Company.

Mines of Nigger Baby Hill

Grand View	Little African
Pelican	B. F. Butler
Phoenix	Ah Joyey
Major	Little Joe
Yellow Jacket	Little Leadville
Falcon	Little Queen
Hope & Cross	Montana
Alma Mater	Pacific
Nellie Bly	Silver Wedge
Iron	Rico No. 2
Last Chance	Silver Glade
Nora Lily	N & B
Arctic Cliff	Uncle Jess

C.H.C. Hill

Named for Charles H. Carpenter, C.H.C. Hill is located north of Rico and forms the lower western slope of Telescope Mountain. The rocks are badly broken and brecciated, and covered by landslide material. This unconsolidated material caused serious problems in keeping the portals of the various mines open. By the turn of the century most of the mining on C.H.C. Hill had been concluded. As one drives north out of Rico, the weathered buildings of the Rico Argentine acid plant may be seen at the foot of C.H.C. Hill.

Mountain Springs mine (Mountain Springs Claim, located in January 1881)

With C.H.C. Hill being literally a labyrinth of shafts, drifts, adits and raises, it was nearly impossible to define the bounds of one mine from those of another. Because of the situation the mines

were often worked cooperatively as groups. The Mountain Springs mine was a member of the Wellington group. The group was originally worked by way of the Wellington shaft. However, when the shaft collapsed, the Mountain Springs tunnel became the main haulage level and eventually the group was referred to as the Mountain Springs mine.

The ore occurred as blankets of argentiferous galena, cerussite and anglesite. Above the ore blankets large bodies of pyrite were present. It is reported that pyrite was present as both loose granular deposits and as solid masses up to 15 meters thick. It was in these beds that some of Colorado's finest crystallized pyrites were recovered.

By the early 1890s most of the group was inactive. The Mountain Springs mine was reopened in 1913, and produced large quantities of copper from newly discovered lead-zinc-copper-iron replacement beds in the limestone. The mine continued to produce copper until 1919, when it was again closed. The outbreak of World War II stimulated mining on C.H.C. Hill one last time. The Mountain Springs mine was brought back to life and continued to produce copper, zinc and lead until final closure in the 1950s.

Mines of C.H.C. Hill

Wellington		Democrat
Zona K.		Clan Campbell
C.S. & H.H.		Governor
Maid of Australia	} Wellington Group	Gunshot
Lottie		Illinois
Mountain Springs		Iron Vault
		Little Laura
General Logan		Mayflower
General Sheridan		Melvina
General Howard		Niagara
General Sherman	} Logan Group	Paymaster
Little Casper		Premier
Goliath		Silver Plume
		Lily D.
C.H.C.		Iron Giant
Athlena		Amanda J.
Limestone		Gold King
Princeton	} C.H.C. Group	Pay Boy
Crebec		Silver Wing
Pigeon		Undine
		Wabash

Newman Hill

Located directly southeast of Rico, Newman Hill forms the lower western slopes of Dolores Mountain. It was on Newman Hill that the blanket deposits were first discovered, and where some of Rico's richest silver mines were located. The slopes of Newman Hill are covered by several meters of float, concealing the true nature of the rock formations found beneath. This overburden of landslide material hid the veins and blankets, causing the development of Newman Hill to lag behind other areas.

Enterprise mine (Enterprise claim, located in 1879)

Located 2.4 km (1.5 miles) southeast of Rico, the Enterprise shaft was sunk to a depth of 11 meters in 1881 by David Swickheimer and associates. Disillusionment soon led to the trading of the claim for a few hundred dollars worth of lumber. Due to the success of neighboring claims (Swansea and Songbird), Swickheimer repurchased the Enterprise and at once began resinking the shaft. On October 6, 1887, at a depth of 81 meters, the first flat orebody (blanket deposit) known to exist was encountered (Farish, 1892). The first assays from the newly discovered deposit ran 519 ounces of silver and 2.1 ounces of gold per ton (Farish, 1892).

In 1891 the Enterprise mine was sold to interests in London for \$1.25 million. With the rich orebodies depleted and the price of



Figure 7. Newman Hill above Rico, Enterprise mine is at right (Lakes, 1905).

silver very low, the Enterprise was closed in 1901. It was reported (Farish, 1892) that massive bodies of pyrite averaging 8-10 ounces of silver and a trace of gold were left behind because they could not be profitably mined. The Enterprise produced over \$4 million worth of precious metals. In 1905 Cross and Ransome reported that most all of the openings into the Enterprise had collapsed.

Rico-Aspen mine (Jumbo claim, located in 1879 on the southwest slope of Newman Hill, just north of Deadwood Gulch)

Access was gained by 5 shafts, the Aspen, Jumbo, Vestal, Montezuma and Silver Glance, and by 2 adits, the Syndicate and Stephanite tunnels. The name of the Stephanite tunnel makes one wonder about the specimens that might have been seen there. While not as large a mine as the Enterprise, the Rico-Aspen was the highest grade silver producer of all the mines on Newman Hill. The Rico-Aspen was contiguous with the Enterprise and the Newman mines, and many of the same veins and blankets were mined by all three. This led to many disputes and lengthy court battles. In 1892, seventy-five 10-ton cars of high-grade silver were being produced in a month (Engel, 1968). However in 1895, due to depressed silver prices, the Rico-Aspen was closed.

Union Carbonate mine (Carbonate claim, located in August of 1879)

This mine is situated high on the northwest spur of Dolores Mountain, about 1.6 km due east of Rico. It was the highest in elevation of all the mines located on Newman Hill. In 1879, two tunnels, driven by separate interests, intersected the same orebody. The Carbonate property spent the next seven years in litigation, with the opposing parties finally agreeing to work together; hence the name Union Carbonate. The workings consist of the Union Carbonate shaft and four adits, the Fickle Goddess being the most noteworthy of the group. The Union Carbonate exploited the

blanket type orebodies previously mentioned. However the ore grade was not as high as in either the Enterprise or the Rico-Aspen and, despite extensive development, the Union Carbonate was closed in 1894. In 1924 the property was reopened, but operated profitably for only 5 years, falling victim to the 1929 stock market crash. Very little remains today that would hint at the activity found on Newman Hill 100 odd years ago. The hill is now totally reforested and one must look closely to find any evidence of mining activity.

Mines of Newman Hill

Enterprise	Eliza Jane
Rico-Aspen	Eureka No. 2
Union Carbonate	Fort Wayne
Lexington Tunnel	Franklin
Golden Fleece	General McPherson
Forest-Payrole	Governor Crapo
Mediterranean Tunnel	Guthrie
Sun Flower	Juniata
Laxey	Newman
Pro Patria Tunnel	Chestnut
South Park	Carbonate Queen
Hibernia	Melvin Clarence
Onamo Tunnel	Mountain Monarch
Isabella	Omaha
Swansea	Orphan Girl
Songbird	Dawn of Day
Laura	Wild Cat
Revenue	Pearl
New York	Raven
Belaire	Rico Muldoon
Black George	Robert E. Lee
Camp-Bird	Slide
Don Pedro	Waltham

Silver Creek

The area referred to as the Silver Creek mining area is found approximately 1.6 km up Silver Creek, and just east of Allyn Gulch. The mines are largely located on the south side of the east-west flowing creek. The Blackhawk mine was the most profitable early mine. However the Argentine mine and a group of later tunnels were to become the center of mining activity in Rico for nearly 40 years.

Rico Argentine mine

The Rico Argentine group or, as it later became known, the Rico Argentine mine, is found on Silver Creek, approximately 2.4 km northeast of Rico. The workings of the Rico Argentine are by far the most extensive of any of the mines found in Rico. In the 1930s, the Rico Argentine Mining Company began acquiring old properties and developing new ones. By the end of 1938 the Rico Argentine mine was in production. Eventually the holdings came to include the Argentine, 517, and Van Winkle shafts, as well as the St. Louis, Blaine, Rico Consolidated, Argentine, Blackhawk and Blacksmith tunnels. Most of the mines comprising the Rico Argentine were originally silver mines. The wealth and fame that eventually came to the Rico Argentine was gained by exploiting replacement deposits of sphalerite, galena and chalcopyrite in the Hermosa formation. Gold and silver were also recovered as by-products. The Rico Argentine continued full production throughout the war years. However the post-war years brought a slack demand for base metals and in 1948 the work force was cut to 50 men.

The uranium boom of the 1950s brought renewed prosperity to the Argentine. Massive pyrite replacement deposits of no previous economic value were mined and used in the production of sulfuric acid, which was vital to uranium processing. An acid plant at the site of the St. Louis Tunnel was completed in 1953, and enlarged in 1956. Pollution of the Dolores River and harmful effects on local vegetation brought about the closure of the plant in 1964. Production of base metals continued sporadically through the 1960s, with final closure coming in 1971. Leaching continued for a few more years. The mine, now idle, is owned by Anaconda Minerals Corporation.

Mines of Silver Creek

Argentine Shaft	} Rico Argentine	Good Hope
Argentine Tunnel		Jersey Belle
517 Shaft		Sonica
Van Winkle Shaft		Little Maggie
St. Louis Tunnel		Parole
Blaine Tunnel		Orphan
Rico Consolidated Tunnel		Lead Year
Blackhawk Tunnel		Paymaster
Blacksmith Tunnel		Richmond
Alleghany		Albany
Leila Davis		Ella D.
Privateer		South Park
Uncle Ned		Tuf Nut
Worlds Fair		Highland Mary
Annie Proctor		Little Mamie
Avalanche		Harvey
D.P.		Wood & Sheivley

Expectation Mountain

As one stands in Rico and looks toward the west, the view is dominated by Expectation Mountain. The lower slopes of Expectation Mountain dip steeply down to the west bank of the Dolores River. While being the site of numerous mines, none of Rico's famous producers were located on Expectation Mountain.

Jones mine (St. Louis Claim, located in July of 1879)

This claim was developed by a tunnel just above the Dolores River. The Jones mine, while not a major mine by any measure, was unique nonetheless. For it was the Jones mine which produced the best native gold specimens ever to be found in Rico. Through the years much confusion has arisen regarding the Jones mine. The St. Louis claim, upon which the Jones mine is located, has often been confused with the properties of the St. Louis Mining & Smelting Company. During the 1920s and 30s, S.L.M. & S.C. developed much property in the area of C.H.C. Hill, most notably the St. Louis tunnel (later owned by the Rico Argentine Company). Many specimens coming from the Jones mine have doubtlessly been attributed to the St. Louis tunnel.

All the gold found at the Jones mine was free gold. It occurred in isolated vugs and pockets along the footwall of small irregular veins. Overall the mine was never totally an economic success. The individual gold pockets were quite often isolated, with much barren rock in between. However each newly revealed pocket produced enough gold to offer new hope and justify more development (McKnight, 1974).

Mines of Expectation Mountain

N. A. Cowdrey	Jones	Minnie
Tomale	Expectation	Modoc
Argonaut	Blue Bell	Mohegan
Potter Tunnel	Argenta	Stranger
Bancroft	Belle of Rico	Monitor
Silver Swan	Burwick	North Star
Little Maggie	D. and R.G.	Perhaps
Ironclad	D.K.D.	Radigan
Whim	Denver	Sixty-Six
Little Leonard	Edith D.	Lowell
Montezuma	Fair Valley	Shamrock Tunnel
Calumet	Gem of Beauty	Sunrise
Aztec	Keystone	Whale
Sambo	Liberty	Smuggler
Zulu Chief	Little Rico	Riverside
California	Lucy P. Brown	

Horse Creek

Located north of Expectation Mountain and running east-west, Horse Creek Gulch was the location of Rico's richest gold mines. The area was heavily assaulted by prospectors, however there was little ore to be found. Most promising claims were eventually deserted with only a few prospect holes left to mark their existence. However a few prospectors did find their dreams in Horse Creek. One such instance was exemplified by the Johnny Bull mine.

Johnny Bull Mine (Johnny Bull claim, located in June of 1880 in Horse Creek Gulch)

Gold was never the life blood of the Rico district; however, in 1880 a rather significant gold strike was made near Horse Creek. Two groups of prospectors claimed the property, and it is reported that gun battles actually took place in the struggle for ownership. The fight was finally settled in court, and for the lucky winners the Johnny Bull produced a million dollars in gold.

Ore at the mine occurred as a stock or chimney which proved good down to the 37-meter level. The Johnny Bull orebody was very much like those which were found near Red Mountain Pass in San Juan County, and is the only source of enargite in the Rico mining district. Two other Horse Creek mines which produced varying amounts of gold were the Puzzle and Gold Anchor. Both mines exhibited the same type of orebody as the Johnny Bull, however only the Puzzle produced gold economically. The Gold Anchor returned assays as high as 90 ounces of gold per ton, but the grade was spotty and on the whole not profitable. The mines of Horse Creek were, with few exceptions, closed by 1890.

Puzzle	Kalamazoo
M.A.C.	Little Maud
Mohawk	Little Wink
Great Western	Lucky Boy
Lackawanna	Parlin
Johnny Bull	Query
Gold Anchor	Rico
Belzora	Rocky Point
Bull of the Woods	Silver Heels
Diamond	Colorado Boy
Dutchman	Stephen B.
Eclipse	Utah
Flying Fish	Venus No. 2
Garfield	Victoria
Heavy Spar	Vulcan
K.P.	

Miscellaneous

A few of Rico's mines could not geographically be placed into any of the well known mining areas, hence the above heading. Though referred to thusly, the most notable of these mines was anything but miscellaneous.

Atlantic Cable mine (Atlantic Cable claim, located in 1869)

Located at the confluence of the Dolores River and Silver Creek (downtown Rico on Main Street), the Atlantic Cable claim was first worked in the winter of 1869-70. The Atlantic Cable, along with the Shamrock (originally known as the Pioneer claim, the first claim located in Rico, 1869) which is located just across the Dolores River, were among a group of claims which first attracted attention to the Rico area. The Panic of 1873 brought work to a close at the Atlantic Cable, not to be resumed until 1878. The Dolores Silver Mining Company restaked the Atlantic Cable claim in May of 1878, and it was patented in March of 1883. It had long been known that much zinc was present in the mines along the Dolores River, however it was not until around 1900 that the extraction of zinc began.

It is thought that one of the earliest methods for the separation of non-magnetic iron sulfides from zinc was developed at the Atlantic Cable mine. Access was gained by way of three shafts, the Atlantic Cable 1 and 2, and the Gas shaft. The Gas shaft owes its name to the presence of carbon dioxide, caused by the seepage of river water onto carbonate rocks in the mine. The Atlantic Cable operated sporadically up to the time of World War II. The flooded mine was dewatered by the Rico Argentine Company during World War II, with much lead, zinc and silver being produced (ore averaged 15-20% lead, 16 ounces of silver per ton). The headframe of the Atlantic Cable mine may still be seen on the west side of the highway as one drives north out of Rico.

Miscellaneous Mines of Note

Atlantic Cable	Eighty-Eight
Iron Dollar	Burns

THE MINERALS

In a state which boasts such mineral producing giants as Leadville, Ouray, Silverton and Telluride (the list could go on and on), it is no wonder that an isolated mining camp like Rico has been relegated to near obscurity, mineralogically speaking. However, before the turn of the century, the mines of Rico produced a large suite of crystallized silver minerals, as well as numerous other species. By 1900 most of Rico's mines were shut down and inaccessible. Because of this lack of supply, and also natural attrition, precious few specimens have endured the 80-100 years which have elapsed since the time of those closures.

dant, flow of fine material was produced by the Rico Argentine mine. However with all mining activity ceased, very little Rico material ever sees the market these days. The few specimens which do surface are quickly gleaned off by "Colorado locality" collectors. It has been my experience that very few groups of collectors rival the Colorado collectors in their passion to acquire specimens. Fortunately, it is through this passion that we are afforded a sampling of the fine minerals that were at one time available.

The following descriptions are of those major crystallized species having significance to collectors. The descriptions are based in part on specimens actually viewed by the author in museums and private collections and in part on descriptions recorded in the literature by Ransome, Rickard, Farish, McKnight and others. Special effort has been made to note the individual mines where the minerals were collected. A list of most of the species found at Rico is included at the end of this section.

Elements

Silver Ag

In a district which achieved its fame from silver, it seems rather shocking that so little specimen material has survived to the present. Factors contributing to this shortage undoubtedly include the early closure of Rico's bonanza mines, mislabeling of existing silver specimens, and the ordinary attrition which sooner or later befalls nearly all older specimens.

Silver from the Rico district is widely reported in the literature. It seems, however, that the Enterprise mine was by far the most prolific source of crystalline material (Farish, 1891; Rickard, 1896; Ransome, 1901). Numerous fine, delicately crystalline silvers from the Enterprise have survived the years. Rickard (1896) reports native silver at the Rico Aspen mine. The Puzzle mine, which was the source of many silver-bearing minerals, also produced some native silver (Ransome, 1901). Other mines which have produced crystalline native silver include the Atlantic Cable (Lakes, 1905) and the Aztec (McKnight, 1974). In recent times the Rico Argentine mine infrequently was the source of some rather nice wire silver, associated with galena and sphalerite.

Gold Au

Though Rico was never known as a famous gold district, nearly all the ore produced contained gold, at least as a minor constituent. By far the finest gold specimens have come from the Jones mine. Leaf and ribbon gold set on yellow to red limonitic matrix make for some truly stunning specimens. The Rico Argentine mine occasionally produced native gold specimens. The mines of Newman Hill produced ore containing as much as 0.5 ounce per ton gold (McKnight, 1974); no doubt some excellent individual pieces existed at one time. Ransome (1901) reported free gold associated with rhodochrosite at the Enterprise mine. Other mines in the district which have reportedly been the source of native gold include the Gold Anchor, Puzzle, Uncle Remus and Johnny Bull (Ransome, 1901). The Johnny Bull is also credited with producing the only gold tellurides in the district (Ransome, 1901), although specific species were not mentioned.

Sulfides

Pyrite FeS₂

If you were to ask the average mineral collector to name a mineral found at Rico, nine out of ten would say pyrite. Such a response would be well founded, as some of Colorado's most attractive pyrites have come from the mines at Rico. Cubes, octahedrons and pyritohedrons are the most common crystal forms represented. The Rico Argentine mine was, over the years, the most steady source of good pyrite. Unfortunately the actual shaft or tunnel that so many of these beautiful pyrites came from has been lost.

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or totally neglected. Most specimens are simply labeled Rico Argentine mine. Looking past the labeling problems, the Rico Argentine mine has produced literally thousands of lustrous groups of pyritohedral crystals. Many of these groups are covered by a silvery gray mineral, long thought to be bravoite. However X-ray analysis has revealed no nickel, only copper. This would suggest that the coating is perhaps chalcocite (Kosnar and Miller, 1976). Lovely groups of sharp octahedral pyrites associated with quartz were also found at the Rico Argentine. Another attractive variety consists of generally small cubes stacked one upon another, often giving the impression of some tiny futuristic city.

The mines of C.H.C. Hill, most notably the Mountain Springs mine, produced gorgeous groups of pyritohedral and modified cubic crystals during the 1950s. The Mountain Springs mine also was the source of some very unusual spherical pyrite specimens (see Kosnar and Miller, 1976, page 304).

At one time, though many years ago, some fairly nice pyrite specimens could be collected on the dumps of the Uncle Ned mine. Other mines which have produced good pyrites include the Johnny Bull, Gold Anchor, Enterprise, Puzzle, Shamrock, Pigeon and Wellington.

Sphalerite ZnS

History has been cruel to sphalerite in the Rico district. Until the turn of the century the presence of zinc was considered a detriment (because of smelting penalties) to an orebody. For this reason little mention of sphalerite was made by the early writers.

The mines of Newman Hill have produced some very nice sphalerites. Black to rosin-colored crystals, associated with quartz, galena, chalcopyrite and rhodochrosite were quite common in the blanket deposits of the Enterprise mine. One specimen labeled only as Newman Hill consists of gemmy green sphalerite with native silver and quartz (Ed Raines, personal communication, 1984). Other Newman Hill producers of sphalerite include the Rico Aspen and the Union Carbonate mines.

In 1901 the Atlantic Cable and the Bancroft mines became the first commercial producers of zinc in Rico. Farish (1891) mentioned the occurrence of sphalerite at the Atlantic Cable, however it was Ransome (1901) who first described dark brown crystals and nodular masses of sphalerite associated with specular hematite, chalcopyrite and galena at that locality. During World War II Rico became Colorado's second largest producer of zinc. The bulk of this production came from the Rico Argentine mine, most notably the Van Winkle shaft. The replacement beds of the Rico Argentine produced thousands of well crystallized specimens of sphalerite in constant association with galena and often quartz. This association was responsible for some very attractive pieces. The Lily D., the Sambo, and the previously mentioned Bancroft mine all were reported to have produced some nice sphalerite specimens.

Galena PbS

Galena was present in nearly all of Rico's mines. It was most commonly associated with chalcopyrite, sphalerite and pyrite. Ransome (1901) reports galena, associated with argentite, tetrahedrite, proustite and polybasite in the Newman Hill mines, and abundantly in the Enterprise mine. Unfortunately few good galenas from the old days exist today. The best galena in the district was extracted from the workings of the Rico Argentine mine. Cubes and cuboctahedrons combined with sphalerite to form some very attractive specimens. Some of the best of these pieces came from the Van Winkle shaft, but very few actually are labeled as such.

Other mines in the district which produced nice galena in varying amounts include the Mountain Springs, Wellington, Yellow Jacket, Falcon, Aztec, Nora Lily, Pro Patria, Revenue, Forest Payrole, Iron Clad and Atlantic Cable (McKnight, 1974).

While much of Rico's silver has come from argentiferous galena, the very richest areas in the orebodies were commonly highlighted by the presence of one or more of the following six minerals. These minerals were among the last to form (Ransome, 1901), and as often as not were found beautifully crystallized. As the high grade pods of ore were the first to be mined, the rich silver minerals became more scarce with the passing of time. By 1900, pockets of these minerals were indeed a rarity.

Argentite-Acanthite Ag_2S

Farish (1891), speaking in general of the minerals of Newman Hill, reported argentite associated with stephanite and polybasite in vugs and vein centers. Farish went on to note that many of the vugs were completely lined with argentite and quartz crystals. Ransome (1901) reported black rounded crystals of argentite at the Enterprise mine. Crystallized argentite also occurred at the Puzzle mine (Ransome, 1901). Some of these old-timers still may be found in the collections of today. One example consists of acanthite on pearceite (both crystallized), labeled simply Newman Hill (Ed Raines, personal communication, 1984). The Rico Argentine has been the source of some nice acanthite specimens, sometimes associated with native gold.

Sulfosalts

Tetrahedrite $(\text{Cu}, \text{Fe})_{12}\text{Sb}_4\text{S}_{13}$

While not a silver mineral by definition, much of the tetrahedrite found in the mines of Rico was highly argentiferous in composition. So much so, in fact, that the presence of tetrahedrite became an indicator of highgrade ore. Though present in many mines, it seems to have been abundant only in the blanket deposits of Newman Hill. Often associated with galena, sphalerite, polybasite, rhodochrosite and quartz, fine crystals of tetrahedrite were reported at the Enterprise and Rico Aspen mines (Ransome, 1901). Ransome also mentions crystallized tetrahedrite at the Gold Anchor, Johnny Bull, Aztec and Iron Draw mines. At the Rico Argentine much silver was recovered from tetrahedrite, and occasionally nice crystals were found associated with sphalerite (McKnight, 1974).

Proustite-Pyrargyrite $\text{Ag}_3\text{AsS}_3 - \text{Ag}_3\text{SbS}_3$

The "ruby silvers" were constant companions, when present, in the mines of Rico, and in much of the early literature were doubtlessly mistaken for one another. Farish (1891) reports ruby silvers on Newman Hill associated with argentite, polybasite, stephanite and native silver. In 1894, Chester described black crystals from the Enterprise mine with brilliant metallic luster, sharply terminated, in association with stephanite, polybasite, tetrahedrite and common sulfides all set in bright pink rhodochrosite. Chester thought these crystals to be argentite, but more likely they were proustite or pyrargyrite. Ransome (1901) refers numerous times to beautiful crystals of proustite and pyrargyrite found in vugs associated with stephanite, polybasite, native silver and quartz. Though these gorgeous minerals were common in Rico at one time, the real tragedy is that so few of them survive today. The ruby silvers were most prevalent in the blanket deposits of Newman Hill, chiefly from the Rico Aspen and Enterprise mines. Pyrargyrite crystals up to 6 mm, associated with argyrodite, were reported from the Iron Clad mine (McKnight, 1974).

Stephanite Ag_2SbS_4

Stephanite was often found as crystals in vein centers associated with quartz (Farish, 1891), and in vugs in massive material (Ransome, 1901). Though found in many of the Newman Hill mines before 1900, stephanite was most prevalent at the Enterprise mine and in the Stephanite tunnel at the Rico Aspen mine. Chester (1894) reports that stephanite was quite common in the rich blanket ores, however he makes no mention of crystals. The Enterprise mine is

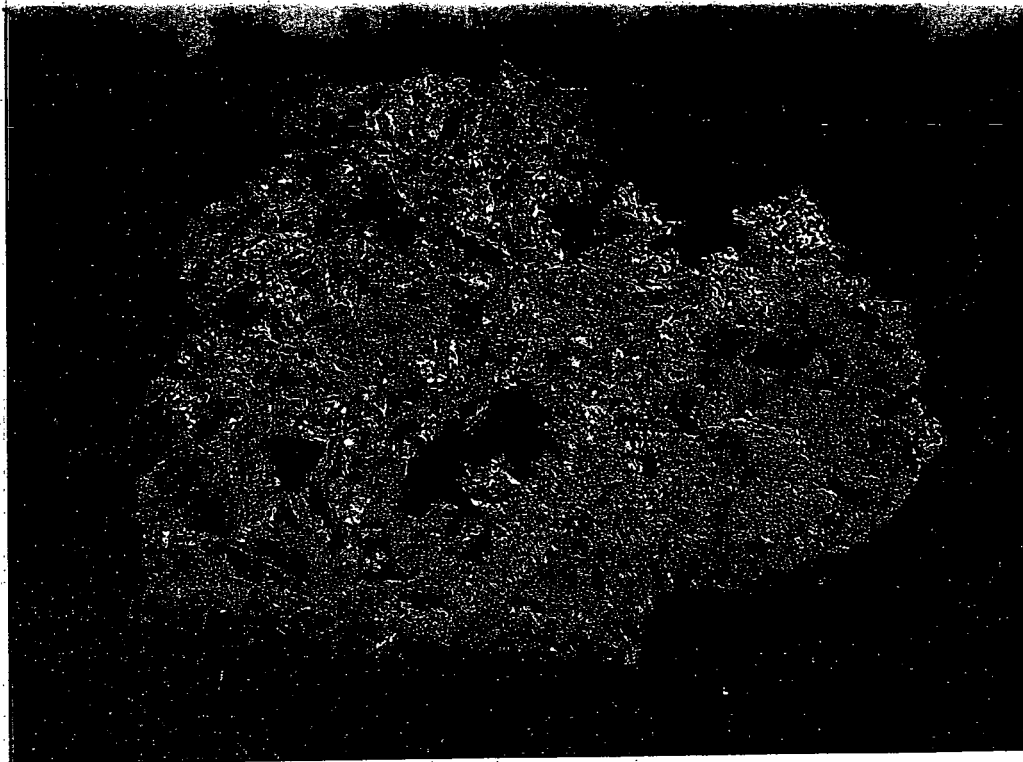


Figure 8. Silver, 4 cm across, from the Enterprise mine, Newman Hill; collected ca. 1890. Author's collection; photo by Jeff Scovil.



Figure 9. Pyrite coated with chalcocite, 5 cm across, from the Rico Argentine mine, Silver Creek; collected ca. 1960. Author's collection; photo by Jeff Scovil.

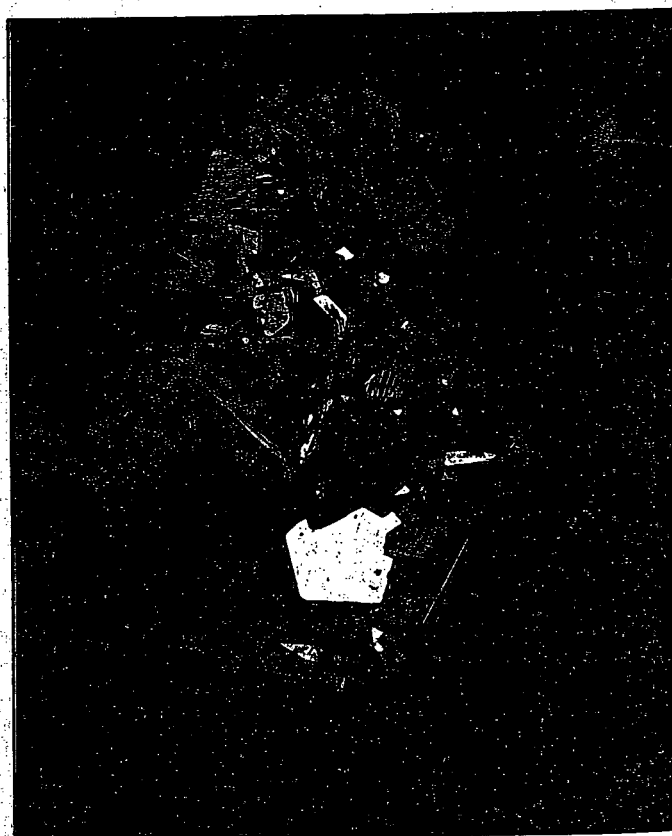


Figure 10. Pyrite, 8 cm tall, from the Mountain Springs mine, C.H.C. Hill; collected in 1954. Author's collection; photo by Jeff Scovil.

credited with producing what is probably the most attractive stephanite specimens found at Rico. These consisted of dull, black, platy crystals associated with lustrous silvery red pyrargyrites. There apparently were no occurrences of stephanite other than in the mines of Newman Hill.

Polybasite $(\text{Ag,Cu})_{16}\text{Sb}_2\text{S}_{11}$

Like the previously mentioned silver-bearing minerals, polybasite was commonly found in the blanket ores of Newman Hill. Ransome (1901) reported crystallized polybasite associated with proustite at the Enterprise mine. The Rico Aspen mine is also credited

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Figure 11. Octahedral pyrite specimen, 3.6 cm across, from the Rico Argentine mine, Silver Creek. Harold Michel collection; photo by Jeff Scovil.

Figure 12. Fluorite, 6 cm across, from the Rico Argentine group, Blaine tunnel; collected ca. 1940. Harold Michel collection; photo by Jeff Scovil.

with producing nice polybasite. At the Iron Clad mine hexagonal discs of polybasite were found associated with pyrargyrite and argyrodite. The Revenue tunnel, on the northwest slope of Newman Hill was also the source of nice crystals of polybasite with quartz (McKnight, 1974).

Halides

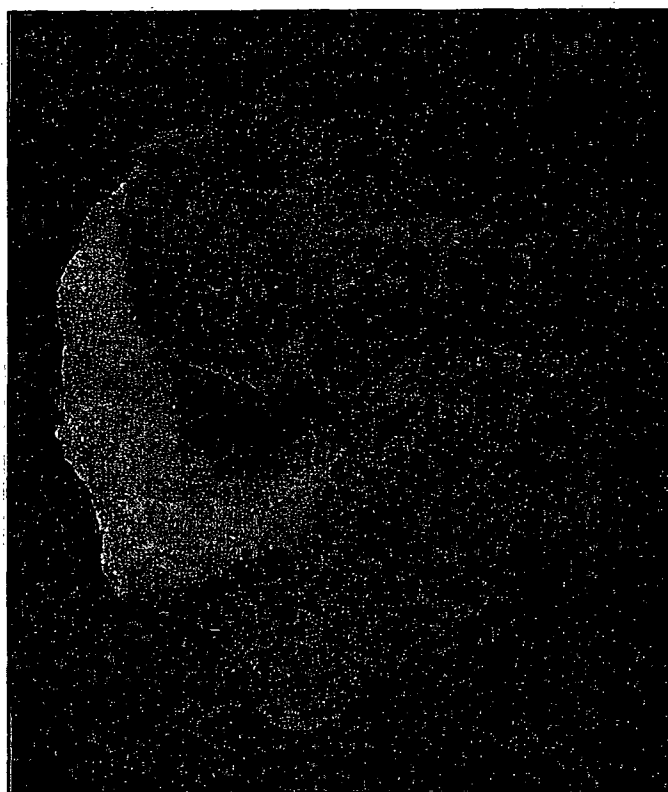
Fluorite CaF_2

Though found in many of Rico's mines as massive material, fine crystallized fluorite was a little more scarce. Ransome (1901) reported nice crystals of pale lilac, pink and colorless fluorite at the Black Hawk tunnel. The Black Hawk material was associated with chalcopyrite, galena and sphalerite. Ransome in the same report mentioned the occurrence of colorless, pink and green fluorite at the Fortuna and Duncan prospect on the north bank of Silver Creek. The finest fluorite observed by this writer was collected in the late 1930s in the Blaine tunnel (Rico Argentine mine), on the north bank of Silver Creek. The crystals are a bluish green in color and are composed of minute cubes stacked one upon another into the shape of crude octahedrons. The Rico Argentine mine has been the source of many fine fluorite specimens. One interesting specimen from this locality consists of purple fluorite with crystallized bismuthinite, collected in the 1930s (Ed Raines, personal communication, 1984). McKnight (1974) reported 12-mm crystals of fluorite from C.H.C. Hill. Newman Hill also produced some nice fluorites, notably at the Hibernia tunnel.

Sulfates

Barite BaSO_4

Barite was not commonly found in the Rico district until the mining of the replacement beds began. Silicious casts of barite show that the mineral was present as an early phase, however in most cases these crystals were leached away before completion of mineralization (McKnight, 1974). These casts can make for some very attractive specimens. One such incidence occurred in the



Blaine tunnel (Rico Argentine mine) where barite had been covered by quartz, then leached away, and then in the voids were deposited scalenohedral manganoan calcite (McKnight, 1974). These types of associations were apparently quite common in the replacement beds of the Rico Argentine mine. The Enterprise mine produced beautiful pseudomorphs of quartz after barite (Rickard, 1897). Perhaps Rico's finest barites came from the west side of the Dolores River on Expectation Mountain. At the Aztec mine, thin white rosettes of barite with individual crystals up to 2.5 cm were found

mine produced druses and clusters of white to golden colored barites.

Carbonates

Calcite CaCO_3

Calcite, commonly called "spar" by the early miners, has always been abundant in the Rico district. Calcite in the district typically crystallizes as scalenohedrons or rhombohedrons and in nearly all cases is manganoan. It would be impractical to cite all the many calcite occurrences, so a few typical finds will be mentioned. On the Blaine level of the Rico Argentine mine, clear to pink scalenohedral crystals with rhombohedral terminations were commonly found (McKnight, 1974). At the Jones mine pale pink, curved rhombohedrons of manganoan calcite were found often associated with the gold pockets (McKnight, 1974). As would be expected in a limestone replacement deposit, the Rico Argentine was the source of hundreds of individual pockets of nice calcite. Other mines producing calcite specimens included the Pro Patria, Revenue, Iron Clad, Atlantic Cable and numerous mines on C.H.C. Hill.

Rhodochrosite MnCO_3

No discussion of a Colorado mineral locality could possibly be complete without mention of rhodochrosite. However, a specimen of Rico rhodochrosite is truly a rare thing. This writer has in fact never seen such a specimen, other than massive material. Early writers spoke of crystalline rhodochrosite frequently. The mines of Newman Hill, chiefly the Enterprise and Rico Aspen, produced the finest material (Ransome, 1901). Curved rhombohedrons of a pale pink color were found on Newman Hill associated with numerous silver-bearing minerals (McKnight, 1974). Rhodochrosite was considered a good indicator of highgrade silver ore in deposits on Newman Hill (Ransome, 1901). The Rico Argentine has produced some rhodochrosite, however massive material is the usual form. Miners speak of rare times when delicate pink rhombs of rhodochrosite were recovered in the Rico Argentine. Other mines producing rhodochrosite include the Pro Patria, Revenue and the Black Hawk tunnel (pre-Rico Argentine mine).

CONCLUSION

As is the case with most mining camps, so it was with Rico: times of boom and times of bust. The saloons, the dance halls and the mines are now faded memories. There remains only an occasional broken down headframe, a weathered mine dump or perhaps an old building to remind us of those lively days in the late 1800s. In the summer of 1900, F. L. Ransome visited the Rico area, and in his subsequent report remarked, "In the year 1900 the only ore being shipped from the district was an occasional carload taken out by leasers working small areas of unexplored ground in the larger mines. Whether the present inactivity is final or not is a question that cannot be decided offhand. Prosperity and depression, following each other in rhythmic procession, are the lot of many mining districts, and it is often difficult to distinguish a state of quiescence from one of extinction." As it turned out, in 1900 Rico was only in a state of quiescence, and though much time has elapsed, Ransome's remarks are just as valid today as they were over 80 years ago. Perhaps now, Rico will be left to rest. However, to those of us who care about such things, there is always the hope of another deposit, another Enterprise or Argentine, one which will again bring life and prosperity to this deserted old ghost.

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Table 1. Minerals reported or observed from the Rico area.

Acanthite	Ag_2S
Allophane	$\text{Al}_2\text{SiO}_5 \cdot n\text{H}_2\text{O}$
Alunite	$\text{KAl}_3(\text{SO}_4)_2(\text{OH})_6$
Anglesite	PbSO_4
Argentite-acanthite	Ag_2S
Argyrodite	Ag_8GeS_6
Barite	BaSO_4
Bismuthinite	Bi_2S_3
Bornite	Cu_5FeS_4
Calcite	CaCO_3
Carnotite	$\text{K}_2(\text{UO}_2)_2(\text{VO}_4)_2 \cdot 3\text{H}_2\text{O}$
Celestine	SrSO_4
Cerussite	PbCO_3
Chalcopyrite	CuFeS_2
Chlorite	$(\text{Mg}, \text{Fe}, \text{Al})_6(\text{Si}, \text{Al})_4\text{O}_{10}(\text{OH})_2$
Copper	Cu
Dolomite	$\text{CaMg}(\text{CO}_3)_2$
Embolite	$\text{Ag}(\text{Cl}, \text{Br})$
Enargite	Cu_3AsS_4
Fluorite	CaF_2
Galena	PbS
Gold	Au
Halloysite	$\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$
Hematite	Fe_2O_3
Jarosite	$\text{KFe}_3(\text{SO}_4)_2(\text{OH})_6$
Limonite	$\text{FeO}(\text{OH})$
Magnetite	Fe_3O_4
Massicot	PbO
Pearceite	$\text{Ag}_{16}\text{As}_2\text{S}_{11}$
Pisanite	$(\text{Fe}, \text{Cu})\text{SO}_4 \cdot 7\text{H}_2\text{O}$
Polybasite	$(\text{Ag}, \text{Cu})_{16}\text{Sb}_2\text{S}_{11}$
Proustite	Ag_3AsS_3
Pyrargyrite	Ag_3SbS_3
Pyrite	FeS_2
Quartz	SiO_2
Rhodochrosite	MnCO_3
Siderite	FeCO_3
Silver	Ag
Sphalerite	ZnS
Stephanite	Ag_3SbS_4
Sulfur	S
Tetrahedrite	$(\text{Cu}, \text{Fe})_{12}\text{Sb}_4\text{S}_{13}$
Wollastonite	CaSiO_3
Vesuvianite	$\text{Ca}_{10}\text{Al}_4(\text{Mg}, \text{Fe})_2\text{Si}_9\text{O}_{34}(\text{OH})_4$
Epidote	$\text{Ca}_2(\text{Al}, \text{Fe})_3(\text{SiO}_4)_3(\text{OH})$
Manganese Oxides	MnO
Selenite	$\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

(continued on page 247)